Use of Ductility Procedures and Tools in the Seismic Retrofit of Bridges

Design Engineers may be instructed by the Strategy Committee to perform detailed Ductility Analysis of bridges for retrofit purposes. In addition, the valid results of research programs sponsored by Caltrans at several universities should be used by our Engineers as soon as they become available.

Following is an approved process to be followed by designers in proceeding with design of a seismic retrofit project:

1. Receive bridge for retrofit.
2. Obtain directions from Project Engineer to the extent and type of analysis.
3. Use *Bridge Design Specifications* as the code of practice.
4. Use "Memos to Designers 20-4" as the code of practice if elastic modeling is appropriate.
5. Use "Displacement Ductility Analysis" as an approved alternative (extension of code of practice) if significant inelastic response is expected. The "Displacement Ductility Analysis" is contained in the "Seismic Bridge Analysis Package."
6. Use results of recent laboratory tests and exercise engineering judgement.*
7. Present results of items 4, 5, and 6 at strategy meetings for discussion.
8. Obtain consensus from the strategy committee on bridge-specific strategy.
9. Obtain approval from the Design Branch supervisors (members of strategy committee) on item 6 as an extension of the code of practice (in the form of "signed minutes" of the meeting).

*Valid test reports are on file in the Special Analysis Section of the Special Analysis Branch.

Supersedes Memo to Designers 20-7 dated September 1993

10. Use the instructions provided by the strategy committee (minutes of the strategy meeting) as a guide to supplement the extensions of the code of practice granted by the Design Branch Supervisors.

11. Document assumptions, conclusions, and recommendations from strategy committee.

12. Finish the retrofit.

The project engineer is ultimately responsible for the design produced under his/her direction, however, the code of practice extended by the Design Branch Supervisors allows the project engineer to take advantage of laboratory test results and new design approaches as they become available. The "code of practice" extensions can be used to create a safe, yet prudent, seismic retrofit design.

Floyd L. Mellon

Jerry A. McKee